

# Rediscovery of *Canidia dorri* Wattlebled, 1886, with discussion of its systematic position (Gastropoda: Neogastropoda: Nassariidae: *Nassodonta*)

**Yuri I. Kantor**

A. N. Severtzov Institute of Problems  
of Evolution  
Russian Academy of Sciences  
Leninski Prospect 33  
Moscow 117071, RUSSIA  
kantor@malaco-sevin.msk.ru

**Richard Neil Kilburn**

Natal Museum  
Pietermaritzburg  
SOUTH AFRICA  
dkilburn@musa.org.za

## ABSTRACT

*Canidia dorri* Wattlebled, 1886, described from Kao-hai Lagoon (near Hue, Vietnam) but until now known only from its original description, was rediscovered in lower parts of rivers at Phan Ri, central Vietnam. Examination of morphology and radula of the species revealed, that it should be allocated to the family Nassariidae and, according to shell morphology, to the genus *Nassodonta* H. Adams, 1867. This is the first confirmed record of genus *Nassodonta* outside Indian waters. The only other Asian species of the family Nassariidae known to inhabit fresh or brackish waters were found in Lake Chilka and other backwater areas in India.

*Additional key words:* Gastropod, brackish water, Asia, Vietnam.

## INTRODUCTION

During a visit to the Fisheries University in Nha Trang (Central Vietnam), as part of the Tropical Marine Mollusc Program (TMMP), the authors came across a sample of an unusual neogastropod. These specimens possess a deep basal spiral sulcus, similar to that found in the Pseudolividae. They were shown to Dr. Nguyen Ngoc Thach, a mollusk specialist and shell dealer in Nha Trang, who recognized the species and offered to collect additional samples with precise data. A sample was subsequently provided to the authors with the note that the species inhabited the lower parts of Vietnamese rivers. Examination of the radula revealed that the species belongs to the family Nassariidae. It was concluded that the species is congeneric with and closely related to *Nassodonta insignis* H. Adams, 1867.

While examining collections of freshwater neogastropods in Muséum national d'histoire naturelle, Paris, the senior author came across two syntypes of *Canidia dorri* Wattlebled, 1886, described from Lagune de Kao-hai, Vietnam. The figured syntype (Wattlebled, 1886: pl. III, fig. 5) differed markedly from the second one, which in turn

exactly matched our specimens. Fortunately, both syntypes contained a dried body, which allowed us to examine its radulae.

Since *Canidia dorri* seems not to have been reported since its original description, we here give a detailed re-description on the basis of both type material and recently collected specimens.

## SYSTEMATICS

Class Gastropoda Cuvier, 1797  
Order Neogastropoda Wenz, 1938  
Superfamily Buccinoidea Rafinesque, 1815  
Family Nassariidae Tredale, 1916  
Genus *Nassodonta* H. Adams, 1867

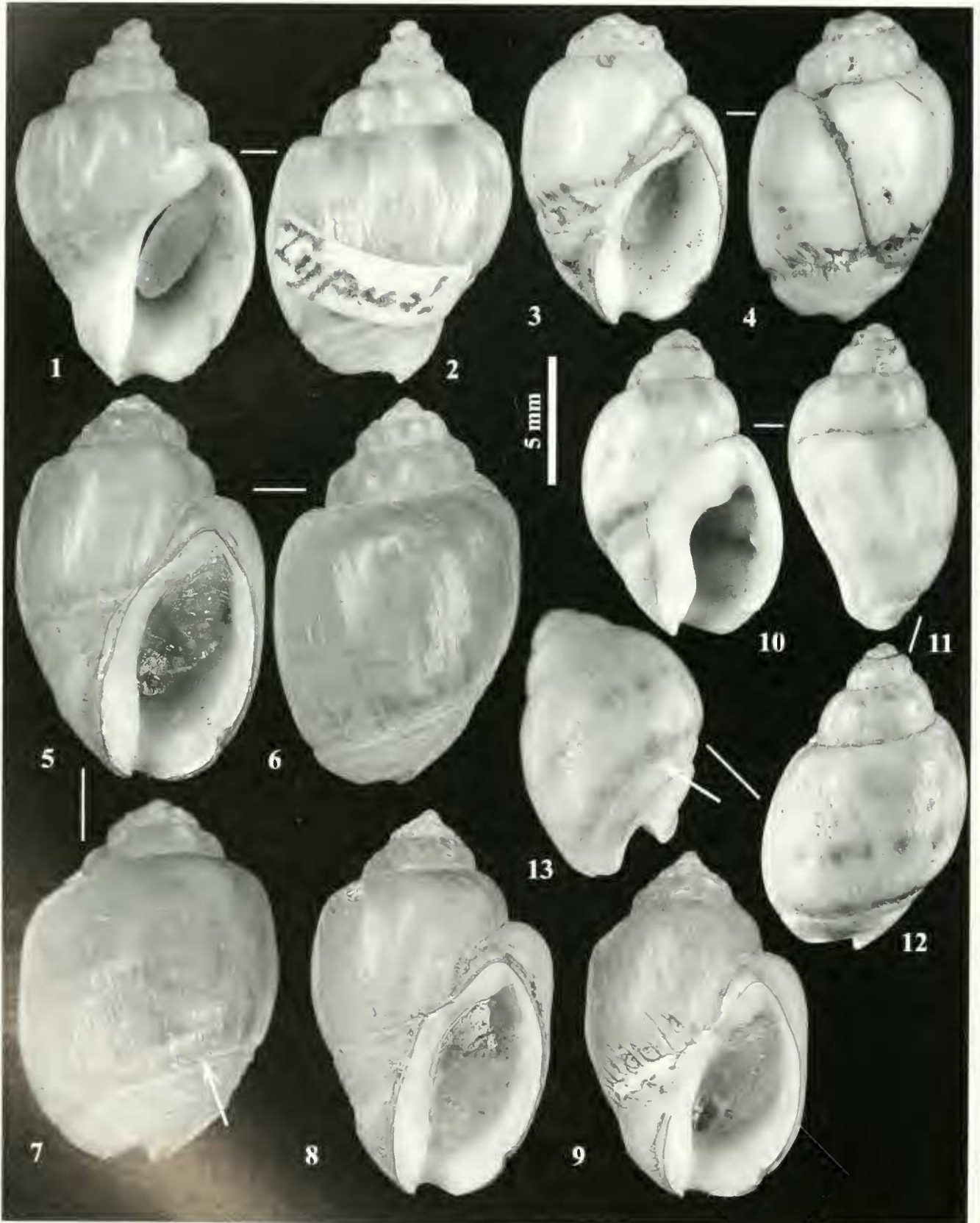
Type species (by monotypy), *Nassodonta insignis* H. Adams, 1867.

**Remarks:** Although Cernohorsky (1954: 199) regarded *Nassodonta* as a subgenus of *Nassarius* Dmèril, 1806, we consider it to be a full genus, characterized by the presence of a conspicuously deep basal groove (sulcus) and by its distinctive radula.

The radula of *Nassodonta*, as exemplified by the species here described, resembles that found in the genera *Bullia* and *Buccinanops* (see Cernohorsky, 1954: figs 78–90), rather than typical *Nassarius*, in the prominent development of accessory cusps on the lateral plates and in the less pectinate appearance of the cusps on the rachidian. However, accessory cusps occur in at least one typical *Nassarius* (see Cernohorsky 1954: fig. 31), and these characters should be regarded as homoplastic.

Although *Nassodonta* was originally described in the Buccinidae, Smith (1895) transferred the genus to the Nassariidae based on shell characters. The presence of a multispinate rachidian tooth of the radula, as illustrated here, confirms this family allocation.

The type locality of *Nassodonta insignis* was given as the Peiho River, China (which is possibly the modern



Figures 1–13. Shells of *Nassodonta*. 1–9, *Nassodonta dorri* (Wattebled, 1886). 1, Apertural, and 2, dorsal views of figured syntype, MNHN. 3, Apertural, and 4, dorsal views of syntype, MNHN. 5–9, Specimens from Phan Ri, central Vietnam. 5, Apertural, 6,

Hai He River, which enters the sea at Tientsien. However, Smith (1895) pointed out that the actual label accompanying the holotype read "Peiho" and referred to it as having been collected together with *Velorita* [the corbiculid genus *Villorita* Gray, 1834]. Noting that the latter was an Indian genus and that undoubted examples of *N. insignis* had been collected in India, Smith queried the Chinese origin of the holotype. Preston (1916) and Cernohorsky (1984) confirmed the occurrence of *N. insignis* in India, living sympatrically with a second taxon, *Nassodonta gravellyi* Preston, 1916, which Cernohorsky synonymised with *N. insignis*. It may be noted that the present material from Vietnam greatly extends the overall known distribution of *Nassodonta*, as previously defined by Cernohorsky.

*Nassodonta dorri* (Wattlebled, 1886) new combination  
Figures 1–5, 13–16

*Canidia dorri* Wattlebled, 1886: 56–57, pl. IV, fig. 2.

**Type material:** Two syntypes, Muséum national d'histoire Naturelle (figures 1–4).

**Type locality:** Lagune de Kao-hai (near Hue).

**Material examined:** Syntypes, 20 specimens from rivers at Phan Ri, now stored at: Zoological Museum of Moscow State University, ZMMU No. Lc-25171, 25172; Natal Museum L5452, The Natural History Museum, London, BMNH 20000391; Muséum national d'histoire naturelle, Paris, MNHN unnumbered; National Museum of Natural History, Washington, DC, USNM 905326, 905327; Academy of Natural Sciences, Philadelphia ANSP 403196; Australian Museum C.356612; National Science Museum, Tokyo, NSMT Mo 72688; Zoological Institution, St. Petersburg, ZIN 59584; University of Fisheries, Nha Trang, Vietnam.

**Distribution (Figure 21):** Central Vietnam, from Hue to rivers at Phan Ri (about 150 km south of Nha Trang). Additional material was collected in the lower parts of rivers, at a depth of about 3 meters.

**Description:** Shell thick, oblong-ovate, usually with subcylindrical body whorl (broadly fusiform in figured syntype) and low, obtuse spire; whorls distinctly shouldered, spire somewhat cyrtocoid, apex mamillate. Protoconch eroded in all specimens.

Aperture oblong, lanceolate, constricted anteriorly. Inner lip with wide smooth callus, its outer edge slightly but distinctly raised, without parietal nodule. Outer lip smooth internally, notched in anterior portion, where it is cut by basal sulcus; outer lip strongly thickened behind



**Figure 14.** Operculum of specimen in figs. 5–7, length 5.7 mm.

edge, but not forming varix. Siphonal canal short, moderately narrow, dorsally forming a fairly shallow notch.

Shell surface slightly glossy, spire whorls with strong prosocline axial ribs, in transverse section rounded and wider than intervals. Axial ribs 9–10 on first and second whorl, on spire extending from suture to suture but on later whorls developing into nodules, which become obsolete mid-dorsally. In figured syntype axial ribs are present on the last whorl, there totalling 10.

Base of last whorl at level of parietal columellar junction with a deep, asymmetrically cut furrow. Fasciole convex with growth lines only. Area between fasciole and basal groove with 1–3 spiral ridges.

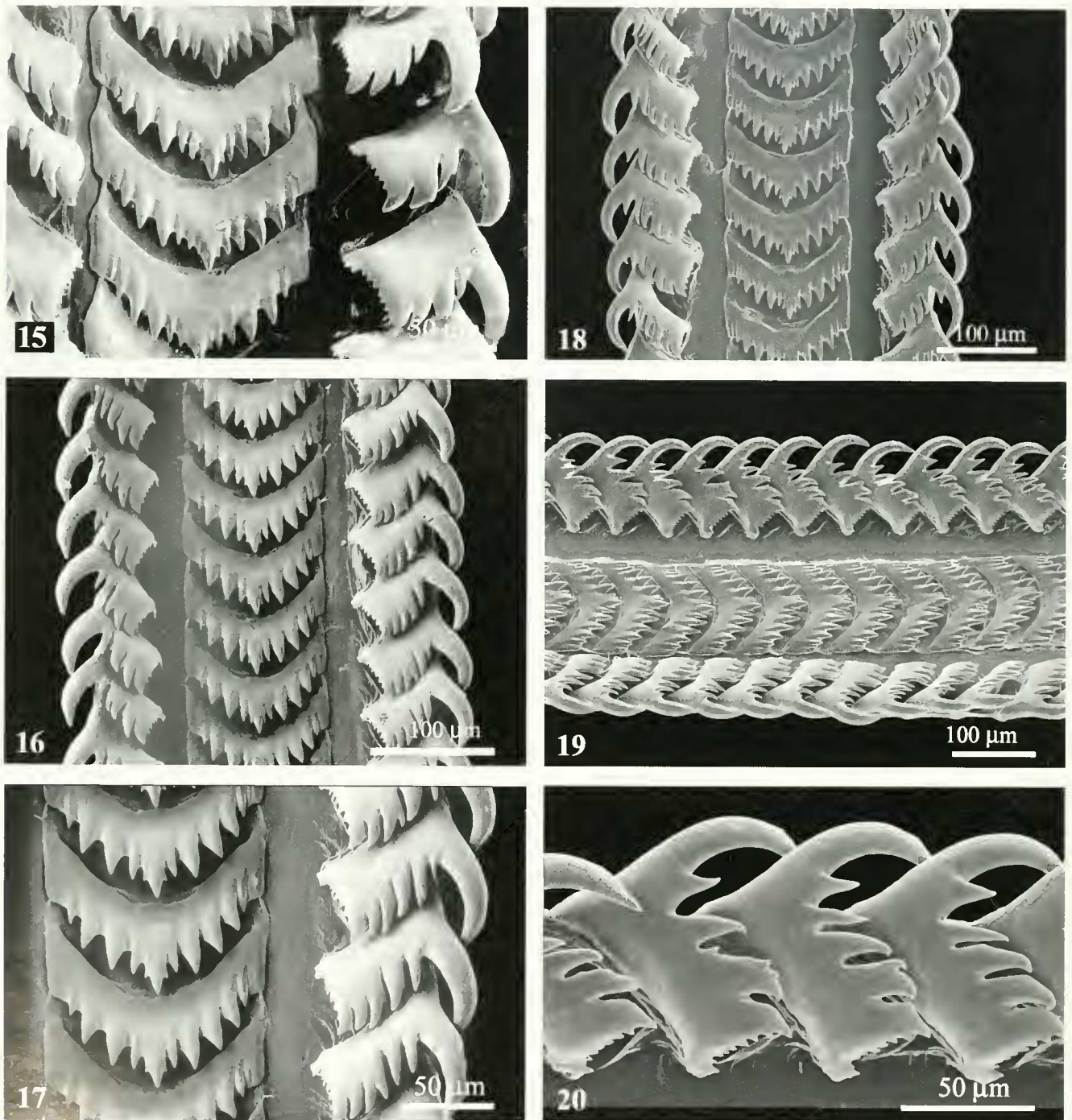
Periostracum smooth, tightly adhering to shell surface, color straw-olivaceous. Shell white beneath periostracum, with inconspicuous axial zigzag sinuous brownish lines, seen at dorsal shell surface, more pronounced immediately above the sulcus. Zigzag lines may be seen on apertural surface of shell, as well as dorsally, although they are always better pronounced on latter. Sometimes these lines are reduced to oblique dots above sulcus.

Operculum (figure 14) elongate-oval, occupying slightly more than  $\frac{1}{2}$  of the aperture length (including the canal), yellow, semitransparent, with terminal, clockwise-coiling nucleus. Growth lines numerous and thickened. See table 1 for shell measurements.

**Anatomy:** Morphology of one female specimen from Phan Ri River (figures 5–7) was examined. Due to its state of preservation, we were not able to study anatomy

←

dorsal and 7, oblique dorsal views, ZMMU Lc-25171, SL = 11.9 mm. Arrow indicate the basal sulcus. 8, Apertural view, Natal Museum, L5452/T1764, SL = 14.2 mm. 9, Apertural view, Natal Museum, L5452/T1764, SL = 13.0 mm. 10–13, *Nassodonta insignis* H. Adams, 1867, holotype, the Natural History Museum, London, BMNH 1878.1.28.428. 10, Apertural. 11, right lateral. 12, dorsal, and 13, oblique dorsal views. Arrow indicate the basal sulcus. All shells at the same scale.



Figures 15–20. Radulae of *Nassodontia dorri*. 15. Dorsal view of mid-portion of radula of figured syntype, MNHN. 16–17. Dorsal view of the mid-portion of radula of syntype, MNHN. 18–20. Radula of the specimen on Figs. 5–7, ZMMU Le-25171. 18. Dorsal view of the mid-portion. 19. Right lateral (45°) view. 20. Lateral view of lateral teeth to show indentation on inner side.

in detail. The rear end of the foot possesses small, paired tentacles, although in preserved specimens these were much contracted. Head with medium-long conical tentacles with large black eyes at their bases. Anterior part of the foot is pigmented with small, widely-spaced black speckles, while the mantle is heavily pigmented.

Proboscis in the retracted position  $\approx$  1.2 mm long

(0.28 SL) and 1.3 mm wide, poorly pigmented. Salivary glands paired, not fused, medium-sized. Valve of Leiblich small, pronounced. Mid- and posterior oesophagus was too poorly preserved for study.

Radula of figured syntype (figure 15) 3.5 mm long (0.25 SL and 0.34 AL),  $\approx$  350  $\mu$ m wide (0.25 SL and 0.031 AL), composed of about 75 rows of teeth. Lateral



Figure 21. Distribution of *Nassodonta dorri* in Vietnam.

teeth with 4–6 cusps (number of cusps varies even on adjacent rows), outermost cusp  $\sim 2.5$  times longer than innermost. Intermediate cusps either sharply pointed or bifurcating at their tips. Innermost cusp with 7–8 denticles on its lateral side. Rachidian with 11–12 cusps, central cusp serrated (number of cusps variable even on adjacent rows). Basal plate evenly and deeply notched along anterior edge.

Table 1. Shell measurements (mm) of *Nassodonta dorri*

Character	Figured syntype	Syntype 2	Range	Average	$\sigma$
Shell length (SL)	14.1	12.0	12.0–14.9	13.69	0.93
Body whorl length (BWL)	11.6	11.0	10.6–12.8	11.61	0.64
Aperture length (AL)	10.3	9.7	8.7–10.8	9.86	0.73
Shell width (SW)	9.5	8.0	8.0–9.6	8.86	0.61
BWL/SL	0.82	0.92	0.81–0.94	0.85	0.04
AL/SL	0.73	0.81	0.70–0.81	0.72	0.04
SW/SL	0.67	0.67	0.61–0.67	0.65	0.02
Number of spiral ridges between fasciole and basal groove	2	1 very weak	1–3	2.42	0.32
Number of axial ribs on first teleo- conch whorl	10	?	9–12	9.2	1.1
Number of axial ribs on second teleo- conch whorl	12	?	9–13	10.7	1.26

Radula of second syntype: figures 16–17, 3.9 mm long (0.33 SL and 0.35 AL),  $\sim 350 \mu\text{m}$  (0.029 SL and 0.032 AL), composed of 73 rows of teeth, 4–5 nascent. Shape of teeth is very similar to that of figured syntype. The specimen from Phan Ri (shell on figures 5–7) have very similar radula (figures 18–20), 4.7 mm long (0.32 SL and 0.44 AL),  $\sim 355 \mu\text{m}$  wide (0.024 SL and 0.033 AL), composed of 85 rows of teeth, 3 nascent.

**Variability (Table 1):** Species fairly uniform in shell shape. The figured syntype differs from all other specimens examined in having a more swollen last whorl and in the complete absence of thickening of the outer lip above the edge of aperture. Although fairly large, this specimen appears to us to be immature, from its thin and still simple lip. Morphology of the upper part of the aperture suggests that the thickening of the lip is in its initial stages, whereas in the other specimens examined it is formed at the end of shell growth.

All other available specimens are much alike. The most variable character is the degree of thickening of the outer lip mentioned above. Zigzag lines may be seen on the apertural surface of the shell, as well as on shell dorsum, although they are always more pronounced on the latter. Sometimes these lines are reduced to oblique dots above the sulcus.

**Remarks:** The main differences between *N. dorri* and *N. insignis* (figures 10–13) (including *N. gravelyi*) are the much lower spire of the former, presence of strong axial nodules, shouldered whorls, strong constriction in the base of the outer lip, the smooth outer lip and the lack of a parietal nodule.

#### DISCUSSION

The species under consideration was originally described in the genus *Canidia* H. Adams, 1862 (Type species [by monotypy] *C. fusca* H. Adams, 1862). The name *Canidia* appeared to be twice preoccupied. Cossmann (1901) proposed the substitute name *Ancneme*. *Ancneme* is

generally considered to be at most a subgenus of *Clea* A. Adams, 1855 (e.g., Thiele, 1929). The type species, *Canidia fusca*, was never illustrated, and the location of its type material is unknown. Two specimens (suspected syntypes) from Cambodia, identified as "*C. fusca*" from the Cuming collection are stored in the collections of BM(NH), no. 20001316, and were examined by the authors. Nevertheless, they do not match the original description and therefore are not types. Thus the real position of *Canidia* remains unclear. The other species that was originally attributed to the genus is *Melanopsis helena* Meder, 1847, which clearly belongs to *Clea*.

Therefore, allocation of *dorri* in the genus *Clea* (*Aenontome*) (= *Canidia*) is certainly wrong. At the same time, the shell morphology is very similar to that of *Nassodonta insignis* H. Adams, 1867, including such an unusual character as the basal sulcus. This induces us to attribute the species to *Nassodonta* with some certainty.

This is the first confirmed record of genus *Nassodonta* outside Indian waters, despite the original type locality of China given for *N. insignis*. According to Dr. Thach the species is abundant in rivers of central Vietnam around Nha Trang and Phan Rang. Although *N. dorri* (like *N. insignis*) appears to inhabit the lower parts of these rivers and is probably found in brackish waters, the salinity of its habitat needs to be investigated.

The only other Asian species of the family Nassariidae known to inhabit fresh or brackish waters, are *Nassarius (Pygmaenassa) subconstrictus* (Sowerby, 1899), *N. (P.) orissaensis* (Preston, 1914) and *N. (P.) fossae* (Preston, 1915) from Lake Chilka and other Indian backwaters (see Cernohorsky, 1984).

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